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14. ABSTRACT
The purpose of this training award is to undertake research focused on evaluating whether racial differences in access to and intensity of medical care for prostate cancer are a fundamental cause of the disparity in prostate cancer outcomes. This work involves first developing a computer model that determines whether population trends in obesity affect race-based disparities in prostate cancer incidence and mortality. We used NHANES data on the rising prevalence of obesity from 1980-2002 together with SEER data on prostate cancer incidence to estimate the effect of obesity on prostate cancer incidence and mortality. Our key finding is that high-grade prostate cancer incidence in 2002 was 13% higher, and high-grade prostate cancer mortality was 6% higher than would have been expected had the prevalence of obesity remained unchanged from 1980-2002. The second phase of this project involves examining how care patterns are correlated throughout all phases of cancer care, and whether race-based differences in patterns of care contribute to observed disparities in prostate cancer incidence and mortality. Exploratory analyses have revealed that obesity and smoking are both associated with prostate cancer screening. Work to be performed in Year 3 will examine race-based differences in screening behavior.

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INTRODUCTION

The purpose of this training award is to undertake research focused on evaluating whether racial differences in access to and intensity of medical care for prostate cancer are a fundamental cause of the disparity in prostate cancer outcomes. This work involves first developing a computer model that determines whether population trends in obesity affect race-based disparities in prostate cancer incidence and mortality. The second phase of this project involves examining how care patterns are correlated throughout all phases of cancer care, and whether race-based differences in patterns of care contribute to observed disparities in prostate cancer incidence and mortality. This award was transferred from Steven Zeliadt, PhD to Megan Fesinmeyer, PhD in June 2007.

BODY

Task 1(Formerly Task 3): Develop a computer model to estimate the contribution of obesity to observed prostate cancer mortality trends. This work used data from the National Health and Nutrition Examination Survey (NHANES)[1], and the Surveillance, Epidemiology, and End Results (SEER)[2] registry to evaluate the role of obesity on prostate cancer incidence and survival. We used NHANES data on the rising prevalence of obesity from 1980-2002 together with SEER data on prostate cancer incidence to estimate the effect of obesity on prostate cancer incidence and mortality. Our key finding is that high-grade prostate cancer incidence in 2002 was 13% higher (Figure 1), and high-grade prostate cancer mortality was 6% higher (Figure 2) than would have been expected had the prevalence of obesity remained unchanged from 1980-2002.

Figure 1. Age-adjusted observed and projected (under 1980 obesity prevalence) high-grade prostate cancer incidence

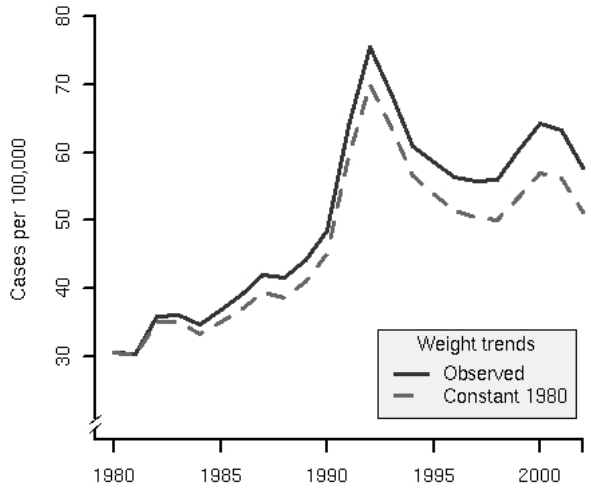
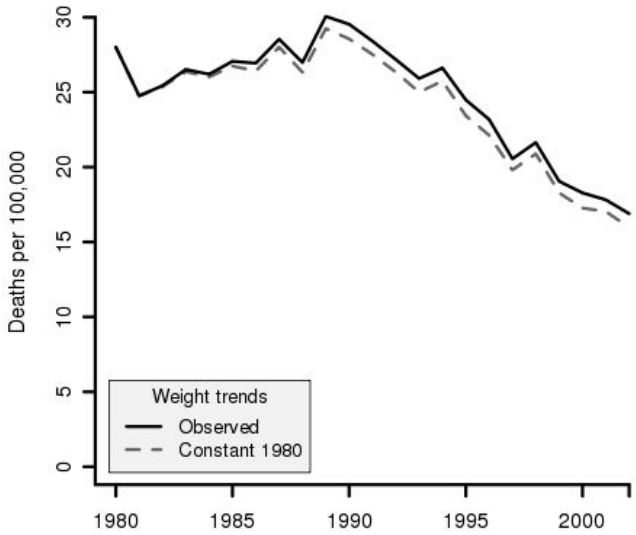


Figure 2. Projected impact of increasing weight trends on prostate cancer mortality.



Task 2 (Formerly Task 1). Estimate how patterns of care by race are correlated across the continuum of care, including the use of screening, aggressive initial treatment, frequency of follow-up surveillance, and intensity of secondary/salvage therapy.

Work on this aim began with an exploratory analysis of race, behavior, and demographic factors associated with prostate cancer screening. Using data from the Medical Expenditure Panel Survey (MEPS), [4] we investigated correlations between race, age, obesity, and smoking status and prostate-specific antigen (PSA) screening behavior. We determined that in all age groups, smokers are less likely to report receiving PSA screening. This may be relevant to our future investigation of race-based prostate cancer disparities, because the prevalence of smoking varies between races in the United States (32% among American Indians/Alaska Natives versus 23% among African Americans, 22% among whites, 15% among Hispanics, and 10% among Asians.[5] We also compared PSA screening behavior between obese and non-obese men, and found that obese men were more likely to have had a PSA test in the past year compared to their non-obese counterparts.

Table 1: Percentage of men receiving PSA test in past year, by age group and smoking status

	Current smokers	Current non-smokers
40-45	7.75	13.86
45-50	19.93	23.21
50-55	27.49	38.56
55-60	32.89	48.77
60-65	41.58	54.04
65-70	45.71	58.94
70-75	43.90	61.59
75-80	37.50	64.44
80-85	50.00	53.51

We initially planned to complete this task using data from Kaiser Permanente. We have been unable to obtain that data; therefore this work will continue using a person-level dataset from SEER-Medicare. This dataset was requested in April 2008 and should be available by September 2008. The SEER-Medicare dataset will include prostate cancer cases and a sample of population controls, and will include variables pertaining to prostate cancer characteristics, race, demographics, and medical claims for screening and treatment. The SEER-Medicare data will enable us to complete the following aims:

1. Measure patterns of prostate cancer care in the following categories:
    a. Timing and frequency of PSA screening patterns three years prior to prostate cancer diagnosis;
    b. Initial course of treatment, including timing and type of treatment;
    c. Timing and frequency of PSA follow-up surveillance five years post prostate cancer diagnosis.
2. Conduct statistical analyses to identify correlations between prostate cancer screening, treatment, and surveillance, and determine whether these correlations vary by race.

Descriptive analyses will be performed looking at proportions of patients based on type of care received for each phase of care. Frequent screening behavior will be defined as having an above average number of PSA screening tests relative to other SEER-Medicare patients. Conversely, infrequent screening behavior will be defined as having a below average number of PSA screening tests relative to other patients. Descriptive tables will be stratified by patient and disease characteristics including age, race, stage at diagnosis, and disease grade. PSA screening behavior will be compared between cancer-free controls and men who are eventually diagnosed with prostate cancer.

The following pairwise correlations will be assessed within groups defined by race: 1) screening patterns and aggressiveness of initial treatment; 2) screening patterns of adequacy of follow-up care; and 3) aggressiveness of initial treatment and follow-up care. In a second analysis, patients will be dichotomized as having received either moderate-high levels of care at

all phases or not. Low levels of care will be defined as infrequent screening/preventive visits, non-curative initial treatment, and less than adequate follow-up visits. Using the dichotomized moderate/high levels of care variable, multivariable logistic regression will be used to determine whether race independently predicts intensity of care.

KEY RESEARCH ACCOMPLISHMENTS

- Estimating the grade-specific prostate cancer incidence assuming constant 1980 obesity levels, using population-based data from NHANES and SEER.
- Development of a simulation model to predict the effect of obesity trends from 1980-2002 on prostate cancer mortality in the United States.

REPORTABLE OUTCOMES

- Manuscript: Impact of Population Trends in BMI on Prostate Cancer Incidence and Mortality in the US, in preparation for submission to the American Journal of Epidemiology, July 2008.

CONCLUSION AND YEAR 3 PLANS

This work demonstrates that the increasing prevalence of obesity among men in the United States may have mitigated improvements in prostate cancer mortality. Interventions aimed at reversing obesity trends may have substantial effects on prostate cancer incidence and mortality.

In Project Year 3, we will expand our model of the role of obesity in prostate cancer incidence and mortality trends to incorporate race variables. We will determine the extent to which obesity trends from 1980-2002 vary between races, and whether race-based differences in the prevalence of obesity have contributed to observed disparities in prostate cancer incidence and mortality. We are investigating the joint impact of obesity and race on prostate cancer mortality in collaboration with mentorship from Dr. Alan Kristal. [3] This work will be a priority in Year 3, and results will be incorporated into **Manuscript 2**: Combined effects of obesity and access to care on racial disparity in prostate cancer. We will also complete Task 2 using data to be obtained from SEER-Medicare (as detailed above) and prepare **Manuscript 3:** Correlation of prostate cancer care patterns in the US.

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APPENDICES

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